~~COLLAPSIBLE CONTAINER~~

The present invention relates to a multi-purpose collapsible container for storing and transporting goods. More particularly, the present invention relates to a multi-purpose container with foldable walls that are easily and reliably secured together in their upright positions in order to provide a stable, stackable and easily collapsible carrying container.

Background of the Invention

Collapsible containers, also known as collapsible crates, are commonly used to transport and store a variety of items. These containers are typically formed of injection molded plastic and are frequently adapted to receive perishable food items, such as produce. When assembled, these containers are rectangular in shape and have a flat base and four upstanding sidewalls. When the containers are not in use, their collapsible features allow their walls to be folded and their volume reduced.

Prior art containers typically have hinges that permit the sidewalls and end walls to move relative to their base. However, when the ends of the hinges are spaced away from the ends of their respective sidewalls, unsecured end sections of each sidewall can flex inwardly in the direction of the interior of the container and damage the contained goods, especially fruits and vegetables. Additionally, many of these hinges are not stable enough to handle the stresses applied to these types of containers.

In conventional collapsible containers, the sidewalls and end walls are normally joined together at their ends, thereby forming corners. However, the corners of conventional containers are not sufficiently rigid to handle the torsional, bending or other stresses that they experience during normal use. Additionally, these corners and the locking members at these corners may not

be rigid or stable enough to handle the compressive pressures created when the containers are stacked on top of each other.

Additional problems can exist with prior art collapsible containers. A first problem results from the difficulties experienced by an operator trying to align the connecting mechanisms as the sidewalls and end walls are being erected. This can be especially problematic when untrained personnel are assembling the containers quickly. Moreover, it is often very difficult for operators to release the locking or latching systems of prior art containers when they need to be collapsed. When the operator becomes frustrated, he can possibly break the container and injure himself.

Another problem is the accuracy of the connections between the sidewalls and the end walls after the sidewalls and end walls have been secured together. Many times, the sidewalls and end walls do not mate properly or they require that an operator specifically and precisely position the adjacent side and end walls together so that the interlocking flanges on these walls engage. Further, once nested, the interlocking flanges of the prior art walls still allow some relative movement of the adjacent sidewalls especially when the containers are heavily loaded.

Other problems exist in the prior art with respect to the sidewalls nesting efficiently upon one another and the sidewalls failing when all of the container walls are in the upright position and the containers are stacked on top of one another. Further, the bases of the collapsible containers in the prior art have been known to fail due to the loads encountered when the containers are employed to ship and store relatively heavy goods.

It is an object of the present invention to overcome the problems associated with the prior art containers.

It is another object of the present invention to provide a collapsible container with easily aligned and securely locked sidewalls.

A further object of the present invention is to provide a collapsible container that has stable sidewalls and rigid corners that permit the container to be stacked with other similar containers.

Summary of the Invention

The present invention relates to a collapsible, reusable container for carrying goods such as produce. The container includes four hinged walls and a base. The walls include two end walls and two sidewalls. These walls can be folded down onto the base so that the container assumes a flat configuration for easy storage. When unfolded, the walls are properly aligned and securely locked together so that they provide a rigid container that can be stacked with other similar containers.

The present invention relates to a collapsible container that comprises first and second sidewalls and first and second end walls pivotally connected to a base. The first sidewall includes at least one latching member that cooperates with a latching member of the first end wall to secure the first sidewall and the first end wall together when the first sidewall and the first end wall are in upright positions. The container also includes a wall locking system that has a plurality of locking members on the first sidewall and at least one locking member on the first end wall. The locking member on the first end wall cooperates with the locking members on the first sidewall to prevent the first sidewall from moving relative to the first end wall in at least one direction when the first sidewall and first end wall are in upright positions. The container further includes a wall alignment system that has a first member extending from one of the sidewalls,

and a second member that extends from one of the end walls. According to the present invention, the first and second members of the wall alignment system cooperate to align adjacent sidewalls and end walls before the sidewalls and end walls achieve a completely upright position.

The present invention also relates to a collapsible container that comprises a base, a plurality of sidewalls and a plurality of end walls. The sidewalls and end walls are secured to the base so that the sidewalls and end walls can move relative to the base and each other. One of the sidewalls cooperates with one of the end walls to form a corner of the container when these walls are positioned upright. The container also includes a wall alignment system that has a first member extending away from a face of one sidewall or one end wall. A pair of receiving members extends away from a face of the other of the sidewall and the end wall. The receiving members form an opening for slidably receiving the first member when the sidewall and the end wall are moved to an upright position. The container further comprises a latching system having a first latching member on one sidewall and a second latching member on one end wall. In this instance, the latching members cooperate to secure the one sidewall and one end wall together as the corner is formed.

The present invention further relates to a collapsible container that comprises a base and a plurality of walls. At least one of the walls includes first and second ends with first and second end surfaces, respectively, that extend perpendicular to the length of the at least one wall. The container also includes a hinging system for securing the at least one wall to the base. The hinging system includes plural hinging members and a pivot axis about which the at least one wall pivots. A plurality of support members extend away from a surface of the at least one wall or an upper surface of the base. Moreover, a plurality of support receiving members are

positioned on the other of the surface of the at least one wall or the upper surface of the base for receiving the support members. Each support member and respective support receiving member are positioned between an outermost surface of an outermost hinging member and one of the ends of the at least one wall.

The wall alignment and latching systems according to the present invention simplify the erection of the container sidewalls by guiding the sidewalls into position adjacent the end walls. Each end wall includes a set of rails that create a guide channel near an upper corner of the container. Each sidewall has a spur (male protrusion) situated at or near its vertical edge for engaging the guide channel on one of the end walls. During the unfolding of the container, the sidewalls are moved toward an upright, vertical position after the end walls have been placed in their final upright position. As the sidewalls rotate relative to the base in order to assume their vertical position, their spurs slide into the guide channels on the end walls. As the spurs mesh with the end walls, the walls of the container are pulled tightly together. This arrangement allows the walls of the container to be rapidly erected as a result of very few steps being performed. In a preferred embodiment, only two steps are performed: (1) raising the end walls, (2) raising the sidewalls.

During the unfolding of the sidewalls, a latching member such as a tab (flange) on a terminal end of a sidewall depresses a latching tab (plate) in the face of the cooperating end wall as the spur moves within the guide channel. The plate is deflected away from the interior of the container when it is in contact with the flange. After the flange passes over the plate, the plate snaps back to its original undeflected position. In this instance the flange is positioned behind

the latching plate and the walls are securely locked together. This arrangement can be easily manufactured.

The rear (outside) surface of each latching tab includes a stopper that limits how far it can be deflected, thereby limiting its elastic deformation. The stopper includes a solid member extending from the rear surface of the locking tab. This solid member extends away from the tab in a direction away from the center of the container to limit the amount of deflection that can be experienced by the tab. The solid limiting member prevents the latching tab from being damaged while the container is being assembled or unfolded. Additionally, it prevents the latching tab from being damaged when a person pushes it in a direction away from the interior of the container when breaking down the container.

The sidewalls of the present invention are hinged to the base. However, the hinges are spaced a considerable distance away from the container corners. To prevent the ends of the sidewalls from deflecting inward and damaging either the container or its contents, the sidewalls include vertically extending projections (pins) on their lower, base contacting surfaces near their corners. The base includes holes for receiving these projections when the sidewalls are in a vertical position. When the projections are positioned in the holes and the sidewalls are erect, the corners of the present container are more rigid than those of the prior art so the containers are more reliable for stacking.

The upper surface of each sidewall and end wall includes a set of spaced stacking tabs. These stacking tabs extend vertically away from the upper surface of the container for mating with pockets in the base of a container stacked on top of it. Additionally, the lower surface of the base includes a plurality of pockets longitudinally spaced along its lower surface near the edges

for receiving the mating tabs of a container on which it is stacked. These pockets and tabs permit the container to meet the specifications for the Fiber Box Association Voluntary Standard "Corrugated Produce Container Modularity Standard" for sizing and stacking.

The locking system according to the present invention forms dovetail joints at the corners of the container. The dovetails of the present invention can be only a fraction of the thickness of the container walls. For example, each component of the dovetail joint can be one-half the thickness of the wall. Alternatively, a first component of the dovetail joint can be one-fourth or one-third the thickness of the wall and the complimentary component can be three-fourths or two-thirds the wall thickness, respectively. This thickness prevents the sidewalls from experiencing movement past the vertical plane when the container corners are being formed. Also, the sidewalls form a corner with their end walls that has full wall thickness. As a result, the resulting corner is very strong and the container can be stacked with other similar containers. The dovetail arrangement also resists outward forces applied to adjacent panels. Moreover, since the joints are only a fraction of the wall thickness and are to the inside of the sidewalls, the resistance to product bulge is increased and the ability for the joints to pop open through mis-handling is virtually eliminated.

This dovetail corner can be accomplished in as little as two steps - pulling an end wall to vertical and pulling a sidewall to vertical. The prior art sidewalls require more motion and additional steps in order to interlock their sidewalls and end walls.

Brief Description of the Figures

Fig. 1 is a perspective view of a collapsible container according to the present invention;

Fig. 2 is a perspective view of a base as shown in Fig. 1;

Fig. 3 is an outside perspective view of a sidewall having a contoured upper surface according to the present invention;

Fig. 4 is an inside perspective view of the sidewall shown in Fig. 3;

Fig. 5 is an elevational view of the outer surface of the sidewall shown in Fig. 3;

Fig. 6 is an elevational view of the inner surface of the sidewall shown in Fig. 4;

Fig. 7 is an end view of one of the sidewalls of the container shown in Fig. 1;

Fig. 8 is an end view of the other sidewall of the container shown in Fig. 1;

Fig. 9 is an outside perspective view of an end wall according to the present invention illustrating an outer surface of the end wall;

Fig. 10 is an inside perspective view of an end wall according to the present invention illustrating an inner surface of the end wall;

Fig. 11 is an elevational view of the inner surface of the end wall shown in Fig. 10;

Fig. 12 is an end view of one of the end walls shown in Fig. 1;

Fig. 13 is a cross-sectional view through one of the end walls shown in Fig. 1;

Fig. 14 is an elevational view of the outer surface of the end wall of Fig. 9;

Fig. 15 is a perspective view of the container shown in Fig. 1 wherein the combined height of the folded sidewalls, shown in Figs. 3-6, is greater than the width of the base;

Fig. 16 is a perspective view of another embodiment of the container according to the present invention wherein the combined height of the folded sidewalls is less than the width of the base; and

Fig. 17 is a perspective view of the embodiment illustrated in Fig. 16 with the sidewalls in an upright, raised position.

Detailed Description of the Invention

Fig. 1 illustrates a collapsible container or crate 10 according to the present invention. Collapsible container 10 can be used to store or transport goods. Container 10 is particularly suitable for transporting produce such as fruits and vegetable, where circulation of air and/or refrigerated gas is necessary to keep the produce fresh and consumable until it reaches a predetermined destination such as a market. This circulation is fostered through the plurality of slots 12 provided on each portion on the entire container, as fully shown in all of the figures. The container 10 can be formed of any of a well-known variety of plastic or polymeric materials by injection molding or other known plastic molding processes that are suitable for forming reusable, collapsible containers.

Collapsible container 10 comprises a base 14, sidewalls 34, 36 and end walls 44, 46. As shown in Fig. 1, each of these walls has a handle opening so that the container can be easily carried. The base 14 includes a bottom panel 15 that forms a lower support surface for carrying and supporting the goods positioned within the container 10. Like the overall shape of the container 10, bottom panel 15 is generally rectangular in shape. However, the container and base can have any shape such as substantially square or substantially oblong. Alternatively, the sidewalls 34, 36 can be substantially straight and the end walls 44, 46 can be slightly curved, or vice versa. Additionally, the container can be of any size. As shown in Figs. 14 and 15, the container 10 can have sidewalls 34, 36 that are any height above the base 14 and any length.

As shown in Fig. 2, the base 14 has two opposed side edges 16 and 18, and two opposed end edges 20 and 22. The base 14 further includes upwardly extending base wall sections 24 and 26 that extend parallel to the end edges 20, 22 and perpendicularly away from the bottom panel

15. These base wall sections 24, 26 can be integrally molded with the base 14. Each wall section 24, 26 has an upper edge 25 for supporting either the sidewalls 34, 36 or the end walls 44, 46 depending upon which set of walls is intended to be folded over the base 14 last and unfolded first.

As shown in Fig. 1, the opposed sidewalls 34 and 36 extend along the length of the base 14 on opposite sides of the bottom panel 15. The sidewalls 34 and 36 are each pivotally attached to bottom panel 15 by a hinge system 37 that is located along the opposed side edges 16, 18 of bottom panel 15. The hinge system 37 permits the sidewalls 34, 36 to be pivoted toward, or away from, the bottom panel 15 along edges 16 and 18 so that they can be positioned in either an upright, unfolded position in which it extends perpendicular to the base 14, or a horizontal, folded position where it extends parallel to the base 14.

As seen in Figs. 1-2, the hinging system 37 along each side of the container 10 includes a plurality of rod sections 38 that extend across a portion of each sidewall 34 and 36. The outermost rod sections 38 are spaced inwardly from the end surfaces 91 of the sidewalls 34 and 36 proximate end walls 44, 46. In one embodiment, the rod sections 38 are formed integrally with the base 14. In an alternative embodiment, the rod sections 38 are joined together as a single member that extends along the entire length of the hinge and through adjacent supports in the base 14. The ends of the single member 38 are supported by the outermost supports.

The hinging system 37 on each side of the container 10 also includes hinge members 39 that extend downwardly from sidewalls 34 and 36 and into openings in the bottom panel 15, as shown in Figs. 1 and 3-6. The hinge members 39 can be integrally molded to, or otherwise unitarily formed with, their respective sidewall 34, 36. As shown in Figs. 4 and 7-8, each hinge

member 39 has a C-shaped cross-section that receives and partially surrounds a respective rod section 38. Each hinge member 39 rotates about its respective rod section 38 so that the sidewalls 34 and 36 pivot and fold with respect to bottom panel 15 with minimal wearing of hinging mechanism 37.

In an alternative embodiment, the hinge members 39 can be secured to their respective rod sections 38. In this alternative embodiment, the rod sections 38 rotate relative to the base 14 instead of the hinge member 39 rotating relative to the sections 38. This hinging system 37 can also be used to hingedly connect the end walls 44, 46 to the base 14, as discussed further herein.

As shown in Figs. 2-4, the hinging system 37 does not extend the full length of base 14. Instead, the hinging system 37 terminates a distance away from the end surfaces 91 of each sidewall 34, 36 to permit easy pivoting of the sidewalls and to reduce the damage that may occur to the hinges if they were placed in close proximity to the ends of the sidewalls. Additionally, the hinging system 37 terminates at points that are spaced from the end walls 44, 46 by pockets 62 that are proximate the end walls 44, 46. This spacing eliminates the need for extending the hinging system into pockets 62 or between these pockets 62 and the end walls 44, 46. As a result, the pockets 62 are able to be spaced along the container 10 so they can receive cooperating stacking tabs 58 from other containers, including corrugated boxes, as discussed below. This distance between the hinge system 37 and the end walls 44, 46 could be any distance that is known in the industry for pockets 62 that receive stacking tabs 58. In order to stabilize the sections 93 of the sidewalls 34, 36 that extend between the hinge system 37 and the end walls 44, 46, the sidewalls 34, 36 and the bottom panel 15 include a wall stabilizing system 80, seen in

Figs. 1, 15 and 16. By stabilizing and limiting the inward movement of the wall section 93, the goods carried by the container 10 are protected against the damage caused by conventional, unrestrained sidewalls.

The stabilizing system 80 include a plurality of stabilizing members 81 positioned along the sidewalls 34, 36 and a plurality of cooperating stabilizing members 82 positioned along the side edges 16, 18 of the bottom panel 15. In a preferred embodiment, the stabilizing members 81 include a plurality of projections or pegs that extend from a lower surface of the sidewalls 34, 36 as shown in Figs. 5-8. The stabilizing members 82 include holes in the bottom panel 15 (shown in Fig. 2) that are aligned with the members 81 in order to receive the projections 81 as the sidewalls 34, 36 are being moved into their upright position. When the projections 81 and holes 82 are mutually engaged (when the sidewalls are partially or completely upright), they provide support, stability and strength (structural rigidity) to the end sections 93 of the sidewalls 34, 36. The structural rigidity added by the stabilizing system 80 and the limited movements of the corners enhance the stacking strength of the container. As shown in Figs. 2 and 5-6, the projections 81 and holes 82 are only located between the outermost hinge member 39 and the end surfaces 91 of the sidewalls 34, 36 that extend along the end walls 44, 46. The projections 81 and openings are located only along section 93. Members 81, 82 are not positioned between adjacent hinge members 39 because the hinge members 39 provide sufficient stability along the middle portion of the sidewalls 34, 36. In an alternative embodiment, the holes 82 could be formed in the lower surface of the sidewalls 34, 36 and the projections 81 extend upwardly away from an upper surface of the bottom panel 15. Also, holes 82 include open holes or recesses with side and bottom walls.

Like sidewalls 34 and 36, end walls 44 and 46 are similarly pivotally attached to the bottom panel 15 by way of a hinging mechanism 48 which is similar in structure to hinging mechanism 37 described above, as shown in FIG. 1. However, unlike the sidewalls, the end walls 44, 46 are folded relative to base 14 at a distance remote from the bottom panel 15. Particularly, end walls 44 and 46 are pivotally attached to upstanding wall sections 24 and 26, respectively, of the bottom panel 15, proximate upper edges 25. The height of the upstanding wall sections 24, 26 is chosen based on the required distance from the bottom panel 15 that the walls 44, 46 must be spaced in order to fold over the folded sidewalls 34, 36 and form a stackable structure with a flat upper surface. As with the sidewalls 34, 36, the end walls 44 and 46 are able to achieve a folded position and an upright position.

As discussed above, the hinging system 48 used for end walls 44, 46 is similar to that described above in association with sidewalls 34 and 36. This system 48 is illustrated in Figs 1, 9. The system 48 includes a plurality of rod sections 38 and C-shaped hinge members 39 with internal bearing surfaces, as shown in Figs. 9 and 12-13. As with hinging mechanism 37, in a preferred embodiment hinging mechanism 48 does not extend to corner line 31 but is remote there from. Also, the rod sections 38 can be part of a single rod or they can be separate, independent sections. Moreover, either the hinge members 39 or the hinge members 39 and the rod sections 38 rotate relative to the base 14 when the end walls 44, 46 are unfolded. When the hinge members 39 rotate relative to the base 14, they rotate within an opening 45 that includes pivot limiting members 88. These members 88 prevent the end walls 44, 46 from pivoting past about 90 degrees relative to the bottom panel 15 (past vertical).

As best shown in Fig. 10, each end wall 44 and 46 has a U-shaped horizontal cross section that is formed by a main end wall portion 50, and two shorter flange portions 52. In a preferred embodiment, these wall portions are integrally formed together as a single unit. The flange portions 52 extend from either side of portion 50. Additionally, the flange portions 52 are oriented orthogonal to main end wall portion 50 and, when the container is assembled, they extend in the direction of the sidewalls 34 and 36.

Referring now to Fig. 1, the collapsible container assembly 10 also includes locking system 64 for securing the sidewalls 34, 36 to the end walls 44, 46 and stabilizing the corners. Moreover, the locking system prevents the sidewalls from moving relative to the end walls in at least the vertical direction and the rotational direction that is past vertical. The locking system 64 provides interlocking engagement between the sidewalls 34, 36 and the end walls 44, 46 when these walls are in their upright position. In a preferred embodiment, the locking system 64 forms dovetail joints at each of the corners with the cooperating elements 66, 67, 68, 69 of the joints forming only a fraction of their respective walls. For example, each cooperating element may be one-half the thickness of the walls. Alternatively, one element may be one-third or one-quarter the thickness of its wall while the cooperating element is two-thirds or three-quarters the thickness of its wall, respectively. No matter their size, the cooperating elements of the joints are hidden from any line of sight when the container is fully assembled and the walls are in their upright positions. The advantages to these joints are discussed above.

The locking system 64 includes flanges 54 at the outer ends of the sidewalls 34, 36 proximate the surfaces 91, and the flanges 52 on the end walls 44, 46. As shown in Fig. 3, the side of each flange 54 that is opposite the interior of the container 10 includes at least one

locking tab 66. In a preferred embodiment, each flange 54 includes a plurality of locking tabs 66 disposed at predetermined spaced intervals by gaps 67. Each locking tab 66 has a substantially triangular shape with the largest portion of the tab 66 extending along edge 91. Each tab 66 also includes first and second locking surfaces 72, 74 that extend between the outermost surface 70 and the main portion of sidewalls 34, 36.

Referring to Figs. 10 and 13, each flange 52 includes at least one tab receiving opening 68 that receives the tab(s) 66 on one of the flanges 54. However, in a preferred embodiment, each flange 52 includes a plurality of tab receiving openings 68. Each opening 68 has a shape that compliments and receives the locking tab 66 in a snug fashion. The triangular shape of tab 66 and the corresponding shape of opening 68 enhance the locking feature of locking system 64. The openings 68 are defined by spacers 69 that extend away from the flanges 52 in the direction of the interior of the container 10. In the present invention, the tabs 66 slide into the openings 68 as the sidewalls 34, 36 are pivoted from the collapsed position to the upright position and into engagement with the end walls 44, 46. The wall of each flange 52 provides a stop against the movement of the tabs 66. In an alternative embodiment, the tabs 66 could be located on the flanges 52 and the openings 68 arranged on flanges 54. When the tabs 66 are received in the openings 68, a first lock for the walls 34, 36, 44, 46 is established and the walls are not able to move laterally relative to one another.

As illustrated in Fig. 1, the container 10 also includes a wall guiding system 100. The guiding system 100 includes a male protrusion or spur 110 positioned along one of the flanges 54 of the sidewalls 34, 36. The spur 110 extends away from the side edge or face of its sidewall in the direction of a respective end wall that is parallel to the length of the sidewalls and

perpendicular to the length of the end walls. As shown in Fig. 3, the spur 110 is secured to the flange/sidewall along only one edge so that it is free to be received by a complimentary female member on a cooperating end wall. Each spur 110 is spaced from the other portions of the flange 54 including the tabs 66 along its height.

As shown in Figs. 10 and 11, each end wall 44, 46 also includes a portion of the guiding system 100 for receiving the spur 110 and aligning the mating portions of the locking system 64 of cooperating walls so that these walls can be easily and properly secured together when the sidewalls 34, 36 are raised as the end walls 44, 46 are in an upright position. The spur 110 is received and guided by an elongated guiding channel 120 formed by two coextensive, opposing, contoured members 125 that extend away from the inner surface or inner face of their end wall in the direction of the interior of the container 10 and substantially parallel to the length of the sidewalls 34, 36, as shown in Figs. 10 and 13. The members 125 also extend along a portion of their respective end walls.

Each member 125 has an outer surface 126 that covers an inner, recessed track 127 in which the spur 110 travels as the sidewalls are raised during the assembly of the container 10. A wide, tapered opening 128 provides access to its respective track 127 so that the spur 110 of the cooperating sidewall will be easily and conveniently received within the channel 120 even if the sidewall is not properly aligned while it is being raised. This receipt of the spur 110 is also facilitated by the angled of flared orientation of the opening 128 relative to the remainder of the guiding channel 120. Fig. 11 illustrates that the sides of the opening 128 can be angled or flared in the direction that the spur 110 travels (the arc that the spur 110 sweeps) as its sidewall is raised so the spur 110 is easily and quickly received by the opening 128 and inserted into the guide

channel 120. The spur 110 can also be angled or curved in the direction of the opening 128 for aiding in the fast and accurate alignment of the sidewalls and end walls.

In a preferred embodiment of the assembly of the container 10, the spur 110 includes two tabs 112 as shown in Fig. 6. As the sidewalls 34, 36 are rotated toward their upright position, their spurs 110 each move toward one of the guiding channels 120. When each spur 110 reaches its respective guiding channel 120, it is received in the opening 128 and its tabs 112 move along the tracks 127 behind members 125 prior to the sidewall coming to a vertical position. The members 125 prevent the sidewalls 34, 36 from moving relative to the end walls 44, 46 in the direction of the interior of the container 10. This increases the accuracy of the wall alignment and reduces the effort and time needed to lock the walls together in their upright positions. Similarly, the meshing of the spurs 110 and the guiding channels 120 pulls the corners of the container walls 34, 36, 44, 46 together so that a tight fit is created. The meshing also aligns the walls with each other so that a latching system 200 can securely hold them together with the minimum number of steps being performed. The spur 110 and the tracks 127 can have any cooperating shapes that permit the walls to be closely aligned as the flange 54 passes over the latching system 200 as discussed below. For example, the spur 110 could have an "L" shape and the tracks 127 a cooperating groove.

In an alternative embodiment, the placement of the spurs 110 and guiding channel 120 can be reversed. In this alternative embodiment, the spurs 110 extend from the flanges 52 and the guiding channels 120 are located on the sidewalls 34, 36.

As shown in Fig. 1, the container 10 also includes a plurality of wall latching systems 200 for releasably latching adjacent side and end walls together when the side and end walls are in

their upright positions. Each wall latching system 200 includes a latching member 210 that is operatively mounted proximate the ends of each end wall 44, 46 near the flanges 52. As seen in Fig. 6, the latching system 200 also includes a latching surface 220 on an inwardly facing surface of a cooperating sidewall 34, 36. Each latching member 210 is formed of the same material as the container 10 and positioned within an opening 230 in its respective end wall. Each latching member 210 includes an inner or actuating face 215 that is on the side of the latching member 210 and its respective end wall that faces into the interior of the container 10. The actuating face 215 is contoured as shown in Fig. 10.

The latching members 210 are secured to their respective end wall along a single edge 211, see Fig. 9. As a result, the edge 211 including hole 244 forms a hinge region 212 about which latching member 210 flexes. The hole 244 helps to distribute the bending stresses created at edge 211 over the entire hinge region 212 so that the stresses are not localized and do not cause premature failure of the container 10. The plastic deformation of the material that forms the hinge region 212 allows the latching member 210 to flex in response to pressure that is applied to its inner face 215. As understood, this pressure can be caused by an operator pressing the latching member 210 in order to release the sidewall or by a flange 54 passing over the latching member 210 as the sidewall is being moved to its upright position, as discussed below. In an alternative embodiment, the biasing strength of the hinge that opposes movement of the latching member 210 is provided by a spring that acts on a rear or side surface of the latching member 210.

The latching member 210 includes a first portion 241 that is flat and coplanar with its respective end wall. The latching member 210 also includes a second portion 242 that is inclined

toward a third portion 243. This inclined profile of the latching members 210 along their second portions 242 permit the sidewalls to be easily and smoothly raised from their folded positions to their upright positions as they pass over their respective latching members 210. As a sidewall is pivoted toward its upright position, a ribbed contact portion 220 of its flange 54 begins to contact the latching member 210 at the second portion 242. This contact causes the latching member 210 to begin to flex at the hinge region 212. However, contact with the second section 242 and flexion of the hinge 212 do not occur until after the spur 110 is received in its guide channel 120. As a result, latching member 210 will not be flexed until after the sidewall and cooperating end wall have been properly aligned.

As seen in Fig. 10, the second portion 242 extends away from its respective end wall in the direction of the interior of the container 10. The third portion 243 extends further into the interior of the container that does the second portion 242. Therefore, when the third portion 243 contacts the flange 54, it forces the hinge 212 to experience full flexion. At this point, the third portion 243 becomes flush with the inner surface of its end wall. When this occurs, the latching member 210 is deflected far enough away from the interior of the container and into opening 230 that the flange 54 can easily move past it and into a locking position. After the flange 54 has passed the latching member 210, the latching member 210 springs back into its original rest position and retains the latching surface 220 of the flange 54 behind it. When the latching surface 220 of the flange 54 is behind the latching member 210, its respective sidewall is stopped from moving relative to the other walls and toward the base 14.

The second portion 242 and the third portion 243 can also be deflected to the above-mentioned extent by depressing a recess 244, or other area, on the second section 242. When

recess 244 is depressed by a person, it causes the hinge 212 to flex and the latching member 210 to move into opening 248. The more pressure applied to the latching member 210, the more deflection that the latching member 210 will experience. When third portion 243 is flush with the inner face of its end wall, the respective sidewall is free to rotate back toward the base 14 and into its folded position. According to the present invention, moving the sidewalls 34, 36 from their folded position to their upright position requires only sufficient force to drive the flanges 54 into the latching members 210 and deflect the latching members 210 until they are substantially flush with the inner surface of their respective end walls.

As shown in Fig. 9, the rear side 245 of the latching member 210 includes a deformation prevention member 250. The rear side 245 faces away from the interior of the container. In a preferred embodiment, the deformation prevention member 250 includes an arm 251 that extends away from the rear side 245. The arm 251 includes a terminal end 252 that is spaced far enough from a horizontally extending stop wall 246 that the latching member 210 can be flexed until third portion 243 is flush with the inner surface of its end wall. However, terminal end 252 is spaced close enough to wall 246 that the hinge 212 will not experience irreversible elastic deformation in response to pressure being applied to the latching member 210. The distance that the terminal end 252 will travel before contacting wall 246 is just slightly longer than the distance that the latching member 210 is deflected when a wall is locked upright or released for folding. In an alternative embodiment, the deformation prevention member is not on a rear surface of the latching member 210. Instead, it extends outwardly away from a rear surface of its respective end wall or sidewall and contacts the back of latching member 210 in order to prevent the hinge 212 from being bent to a point where it experiences irreversible deformation.

As shown in Figs. 1 and 6, the top surfaces 43 of the sidewalls 34, 36 and the end walls 44, 46 are contoured. These surfaces 43 have a plurality of stacking tabs 58 that extend upwardly in a direction away from base 14 for being received in pockets 62. As shown in Fig. 2, the receiving pockets 62 are positioned along the bottom, outer edge of the base 14 so that the container 10 can be securely stacked on top of another container in ether a chimney stack or a cross stack pattern. As is well known in the art, chimney stacking includes positioning containers on top of each other so that they are all oriented in the same direction. Conversely, cross stacking includes stacking the containers so that containers from adjacent rows are oriented in alternate directions and containers from alternating rows are oriented in the same direction. The stacking tabs 58 and the receiving pockets 62 permit a user of these containers to interlock them while their walls are in an upright position. As a result, in either stacking pattern, a plurality of the stacking tabs 58 engage a corresponding number of receiving pockets 62 in order to prevent relative movement between the stacked containers.

In a preferred embodiment, the shape of the stacking tabs 58 and receiving pockets 62 is rectangular. However, any shape that can be used to securely stack containers on top of each other could be employed. Also, it is possible for the stacking tabs 58 to extend from the bottom of the base 14 and the receiving pockets to be positioned around the top surfaces. It is also possible for the container 10 to nest with other containers when the sidewalls 34, 36 and end walls 44, 46 are in folded positions.

As discussed above, the sidewalls 34, 36 can have any height. However, when the combined height of the sidewalls 34, 36 including their stacking tabs 58 is greater than the width of the base 14, as shown in Fig. 15, the top surface 43 of each sidewall 34, 36 includes recesses

56. These recesses 56 correspond to and receive the stacking tabs of the opposing sidewall when the sidewalls 34, 36 are folded. The recesses 56 eliminate the need for the sidewalls 34, 36 to be folded on top of each other. As a result, the folded height of the container 10 remains low because the height of the bottom panel 15 is not increased so that the end walls 44, 46 can be folded over the sidewalls 34, 36. The relationship between the stacking tabs 58 and the recesses 56 is clearly shown in Figs. 1 and 15. The recesses 56 can also be used to receive other portions of an opposing sidewall. When the height of the sidewalls 34, 36 is less than the width of the base 14 and the stacking tabs 58 will not engage the opposing sidewall, the top surface 43 of each sidewall does not need to be notched as shown in Figs. 15 and 16.

It is understood, of course, that while the forms of the invention herein shown and described include the best mode contemplated for carrying out the present invention, they are not intended to illustrate all possible forms thereof. It will also be understood that the words used are descriptive rather than limiting, and that various changes may be made without departing from the spirit or scope of the invention as claimed below.